

C O N T E N T S

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T.M. KOZLOVA, V.N. SAKHAROV, I.K. PROSKURINA, M.V. DOROGOV

SYNTHESIS OF NEW SULFAMIDE DERIVATIVES OF 1-H-INDAZOLE-3-CARBOXYLIC ACID

The method for the synthesis of sulfamide derivatives of 1-*H*-indazole-3-carboxylic acid by direct sulfochlorination of indazol followed by amidization reaction of forming sulfochlorides was developed.

Key words: sulfamide, sulfochlorination, 1-*H*-indazole-3-carboxylic acid, indazole derivatives

T.V. TIKHOMIROVA, V.E. MAIYZLISH, G.P. SHAPOSHNIKOV

SYNTHESIS AND PROPERTIES OF TETRAKIS(R-BENZOYLAMINO)- AND TETRAKIS(R-BENZOYLOXY)PHTHALOCYANINES OF COPPER

New substituted benzoyloxy(amino)phthalonitriles were obtained. Organic-soluble copper phthalocyanines were synthesized on the base of new precursors. The influence of nature of bridging groups (-O-; -NH-) and acyle group on the character of UV-Vis spectra and on the absorption bands location were revealed. The synthesized phthalocyanines in organic solvents were found to exist in the associated state mainly.

Key words: synthesis, spectra, phthalonitrile, phthalocyanine, association

M.S. CHERKALIN, A.A. SHETNEV, T.A. BOBOVA, A.V. KUZNETSOV, A.V. KOLOBOV

SYNTHESIS OF PYRIDAZINONE DERIVATIVES FROM AROMATIC AND CYCLOALIPHATIC KETONES

A number of new pyridazinone derivatives – perspective building-blocks for the synthesis of biological active compounds were obtained on the scheme including the aldol condensation.

Key words: aldol condensation, pyridazinon, alkylation

V.A. TORMOZOV, I.E. YAKUNINA, N.V. KHLITIN, A.N. SHUMSKIY, I.V. SHAKHKEL'DYAN,

Yu.M. ATROSHCHENKO, K.I. KOBRAKOV

SYNTHESIS OF NEW PYRAZINE DERIVATIVES OF MERCAPTOACETIC ACID

The method of (3-alkoxy-pyrazine-2-ylthio) acetic acid synthesis was offered based on the successive substitution of halogen atoms in the 2,3-dichloropyrazine under the action of O- and S-nucleophiles. By the method of liquid phase parallel synthesis on the base of the synthesized compounds the combinatorial library was created for carboxamide derivatives, which are used at the preclinical step of development of new pharmaceutical substances.

Key words: pyrazine, mercaptoacetic acid, nucleophilic substitution, combinatorial synthesis

G.M. SERGEEV, E.V. ELIPASHEVA, D.V. SLADKOV, P.N. KULIKOV

IONOMETRIC DETERMINATION OF CHLORIDE-IONS IN DRINKING WATER OF DIFFERENT MINERALIZATIONS

The unified method of ionometric determination of chloride -ions in drinking waters of different mineralizations (0.1 – 3.5 g/L) was developed with the use of chloride-ion selective electrodes of various firms. The recommended method is inferior with respect to the accuracy to Standard State methods (argentometric and mercurimetric titration). Method proposed unlike Standard one is characterized by high productivity and capability of automation.

Key words: chloride-ions, geometric methods, drinking water

N.I. GIRICHEVA, G.V. GIRICHEV, V.M. PETROV, S.N. IVANOV, Yu.S. MEDVEDEVA

MASS SPECTROMETRIC STUDY OF VAPORIZATION PROCESSES OF NITROSUBSTITUTED BENZENESULPHONIC ACID

By means of mass-spectrometric method the saturated vapors of benzenesulphonic acid and 2-nitro-, 3-nitro- and 2,4,6-trinitrosubstituted acids was shown to consist of corresponding monomeric molecular species. These compounds are thermally stable in vacuum, at least, up to temperatures of 396, 394, 431, 444 K, respectively. The schemes of processes of molecules fragmentation under electron impact were offered on the base of the mass-spectra obtained. The influence of ortho-substituents on distribution of ion current intensities in mass-spectra of nitrosubstituted benzenesulphonic acids was established.

Key words: mass spectrum, benzenesulphonic acid, nitrosubstituted benzenesulphonic acid

E.I. MALYSHEVA, I.K. GARKUSHIN, T.V. GUBANOVA
TERNARY RECIPROCAL SYSTEM Li, K || VO₃, MoO₄

By differential thermal analysis the phase equilibria were studied in ternary reciprocal system Li, K || VO₃, MoO₄. Fields of crystallization of phases were differentiated. Phase reactions for each element of the phase diagram were described. The composition and melting temperature of quasibinary eutectics and three ternary eutectics were determined.

Key words: thermal analysis, phase equilibria, eutectic, T-x diagram

T.A. LEBEDEVA, N.SH. LEBEDEVA, V.P. KULINICH, G.P. SHAPOSHNIKOV
THERMAL OXIDATIVE DESTRUCTION OF ERBIUM AND YTTERBIUM PORPHYRAZINE COMPLEXES

The thermal stability of lanthanide-porphyrazines of metal-macrocylic composition of 1:1; 1:2 was studied. The influence of metal nature, peripheral substitution in macrocycle and extraligand on the parameters of thermo-oxidative destruction was revealed.

Key words: thermal oxidative destruction, thermograms, porphyrazines, lanthanide complexes

L.A. KOCHERGINA, O.N. KRUTOVA
THERMOCHEMICAL INVESTIGATION OF REACTIONS OF ACID - BASE INTERACTION
IN AQUEOUS SOLUTION OF D,L- α -ALANYL-GLYCINE

The heat effects of interactions between solution of D,L- α -alanyl-glycine and KOH and HNO₃ were measured by direct calorimetry at 298.15K and at ionic strengths of 0.5, 1.0, and 1.5 created by adding KNO₃. The heat effects of stepwise dissociation of dipeptide were determined. The standard thermodynamic characteristics ($\Delta_r H^\circ$, $\Delta_r G^\circ$, $\Delta_r S^\circ$, ΔC_p°) of reactions of acid-base interaction for water solutions of D,L- α -alanyl-glycine were calculated. The thermodynamic characteristics interrelation of dipeptide dissociation with the composition of given compound was considered.

Key words: thermodynamics, solutions, chemistry, calorimeter, peptides

A.G. NAZMUTDINOV, A.A. SAMAROV, T.N. NESTEROVA
CRITICAL TEMPERATURES OF LINEAR ALKYLFORMATES

The critical temperatures of ethyl, n-propyl, n-butyl, n-pentyl, n-hexyl, n-heptyl- and n-octylformates were measured with the express original pulse method developed for thermally unstable organic compounds. For ethyl formate, n-propylformate the critical temperatures were determined with a classical visual method. The critical temperatures of studied alkylformates were recommended.

Key words: critical temperature, the determination method, linear alkylformates, thermal stability

A.A. SAMAROV, A.G. NAZMUTDINOV, T.N. NESTEROVA
CRITICAL TEMPERATURE OF ISOPROPYLFORMATE AND ISOBUTYLFORMIATA

The critical temperatures for isopropylformate and isobutylformate were determined with the ampoule method developed by the authors at the exposition time of 1 minute under keeping the compounds stability.

Key words: critical temperature isopropylformate, isobutylformate, thermal stability

D.S. SALNIKOV, I.A. DEREVENKOV, S.V. MAKAROV, E.N. ARTYUSHINA
INTERACTION OF HYDROXOCOBALAMINE WITH GLUCOSE

Kinetics of reaction between hydroxocobalamine and glucose in aqueous solutions was studied spectrophotometrically. The activation parameters of process were determined. Reaction was shown to obey the Michaelis-Menten mechanism and the intermediate product is a complex of cobalamine-glucose. The data received were compared with the results of kinetic study for the glucose reaction with cobalt tetrasulfophthalocyanine.

Key words: cobalamine, glucose, kinetics

S.V. ZAIYTSEVA, S.A. ZDANOVICH
COORDINATION PROPERTIES OF 5,15-DIPHENYL-3,7,13,17-TETRAMETHYL-2,8,12,18-TETRABUTYL-PORPHYRINATE OF ZIRCONIUM(IV) DICHLORIDE IN REACTION WITH ORGANIC N-BASES

The 5,15-Diphenyl-3,7,13,17-tetramethyl-2,8,12,18-tetrabutylporphyrinate of zirconium(IV) dichloride was synthesized and its spectral characteristics were obtained. Its coordination properties in reactions with organic N-bases were studied by methods of spectrophotometric titration and computer simulation. The structure was determined and the stability of zirconium porphyrinate molecular complexes was estimated both by theory and experiment. The influence of conformational and electronic factors on coordination properties of the compound under the study was pointed out. The deformation degree of zirconium porphyrinate macrocycle as well as its molecular complexes was estimated. The agreement of experimental and computed characteristics was shown to be good.

Key words: porphyrin, complex, coordination

A.V. NOSKOV, M.V. TESAKOVA, I.A. POPOV, V.I. PARFENYUK
KINETICS OF OXYGEN ELECTROREDUCTION REACTION ON ROTATING ELECTRODE
ACTIVATED BY DERIVATIVES OF TETRAPHENYLPORPHIN

The electrocatalytic properties of tetrakis (4'-methoxyphenyl) porphin and its cobalt complexes in oxygen electroreduction reaction in potassium hydroxide water solution were studied by controlled potential voltamperometry method

using rotating disc electrode. The process was established to proceed with the mixed diffusion-kinetic control for activated electrode containing tetrakis (4'-methoxyphenyl) porphinatocobalt(II) and tetrakis(4'-methoxyphenyl)porphinatoclorinecobalt(III) in active mass.

Key words: tetrakis (4'-methoxyphenyl)porphin, molecular oxygen electroreduction, electrocatalyst

V.V. CHUGUNOV, M.I. BAZANOV, T.G. KOMAROVA, N.V. CHIKUNKOVA, V.V. CHERNIKOV
FEATURES OF CORROSION BEHAVIOR OF COPPER, BRASS AND STEEL IN CITRIC
ACID WATER SOLUTION WITH DIFFERENT INHIBITORS

The corrosion process of copper, brass and steel in citric acid water solutions was investigated by a gravimetric method. The inhibiting action of various organic additives (benzotriazole, urotropine) was shown.

Key words: corrosion, gravimetry, inhibitors, citric acid

N.N. POLULYAKHOVA
THERMODYNAMIC AND KINETIC ASPECTS OF IONS EXCHANGE ON INORGANIC CATIONITES

Sorption static isotherms were studied for Cu^{2+} , Zn^{2+} , Cd^{2+} , Pb^{2+} cations from multy-component solutions on an inorganic cationite. The thermodynamic constants of ion exchange were determined. The values of isobaric-isothermal potential were calculated.

Key words: sorption, metal cations, water purification, constant

G.G. SHABUNINA, N.N. EFINOV, T.G. AMINOV, V.M. NOVOTORTSEV
CONDITIONS OF OBTAINING AND PROPERTIES OF CuGaTe_2 DOPED BY Fe

The conditions of obtaining the solid solutions of CuGaTe_2 {Fe} with single and double substitution with iron in the cation sublattices were studied. Boundaries of the fields of homogeneity in both systems were specified. According to the measurements of the magnetization the both series of solid solutions are superparamagnets. The magnetic moments of appropriate clusters and the number of iron atoms in them were estimated using the Langevin functions.

Key words: magnetic semiconductors, chalcopyrite

E.V. MORGUNOVA, V.I. LUTSIK, A.E. SOBOLEV
KINETICS OF LEAD (II) SULPHIDE INTERACTION WITH NITRIC ACID SOLUTIONS

The dissolution kinetics of lead (II) sulphide in solutions of nitric acid was studied using the rotating disk method. The conditions of process proceeding was revealed. At nitric acid concentrations below 6 mol/L the process was found to be kinetically controlled. Under these conditions the autocatalytic influence of products of nitric acid reduction on the rate of its interaction with lead (II) sulphide was observed. At acid concentrations exceeding 6 mol/L the diffusion difficulties were appeared and the decrease of the process rate was marked. The reason why the rate of lead (II) sulphide transfer into solution is sharply decreased with the acid concentration rise was the decreasing in the solubility of reaction products.

Key words: dissolution kinetics, lead sulfide, nitric acid, rotating disc method

A.A. ERUBAYI, V.K. BISHIMBAEV
INTERACTION OF CaSO_4 WITH CARBON AND METHANE MIXTURE

The results of thermodynamic modeling the interaction of CaSO_4 with a mixture of carbon and methane are given. Originally, the CaCO_3 was established to form. The CaS is the intermediate product the amount of which is increased at the increase of replacement degree of carbon on methane. The replacement carbon on methane decreases the formation degree of CaO due to the formation of hadly redusing CaS in the temperature range of 1500-1800 K. Pressure decreasing in system from 0.1 to 0.001 MPa decreases the temperature of the complete decomposition of CaSO_4 to CaO from 1850 to 1600 K.

Key words: calcium sulfate, methane, carbonate, calcium sulfide, calcium oxide, thermodynamical modeling

A.A. PYATACHKOV, T.V. PYATACHKOVA, T.V. ERSHOVA, T.F. YUDINA
INFLUENCE OF CONDITIONS OF DIELECTRICS SURFACE TREATMENT ON QUALITY
OF CHEMICALLY PRECIPITATED COPPER

The quality of copper precipitates obtained from electrolytes of chemical copper coating was studied at different methods of surface treatment.

Key words: chemical copper coating, sensitizing, activating

V.Yu. PROKOFIEV, N.E. GORDINA, A.B. ZHIDKOVA
SYNTHESIS OF GRANULATED ZEOLITES WITH STRUCTURE NaA FROM KAOLIN

The synthesis of NaA type zeolite by mechanochemical activation of solid phase was shown to be possible from a mixture of metakaolin, NaOH and $\gamma\text{-Al}_2\text{O}_3$. Using as raw material noncalcined kaolin results in the formation of sodalite. The optimal concentration of sodium hydroxide solution on the step of hydrothermal crystallization was established to be 4-6 mol/L.

Key words: synthesis, NaA zeolite, kaolin

E.V. ALOPINA, T.A. AGEEVA, O.I. KOIFMAN

IMMOBILIZATION OF COPPER COMPLEX OF 2-FORMYL-5,10,15,20-TETRAPHENYLPORPHYRIN ON POLYVINYL ALCOHOL

The process of immobilization of copper complex of 2-formyl 5,10,15,20-tetraphenylporphyrin on the polyvinyl alcohol (PVA) was studied in the aprotic solvents: DMF and DMF- ethylene glycol mixture. The immobilization was carried out using acetylation reaction. The immobilization mole fraction and porphyrin mass content in the immobilizate are determined with the polymer state in solution and conditions of synthesis carrying out. The optimal conditions of immobilization reaction proceeding on PVA were determined at sulfur acid use as a catalyst.

Key words: copper 2-formyl- meso-tetraphenylporphyrin, covalent immobilization, metalporphyrins, immobilizates, polyvinyl alcohol

M.S. SOLODOV, A.S. SOLODOV, V.S. KLEMENKOVA, E.S. SOBOLEVA

ELECTROSYNTHESIS OF INTERPOLYMER COMPLEXES OF POLYANILINE

Using electrochemical methods a comparative study of synthesis of polymeric complexes of polyaniline in acids with different chemical structure was carried out. The influence of reagent concentrations both on the rate of polymerization of aniline and on the shape of kinetic curves was established. It allows to control with the kinetics of electrochemical synthesis of polyaniline and its complexes.

Key words: polyaniline, polymerization, cyclic voltammograms, polymer synthesis, structure

A.A. MAKHNIN, A.A. MAKHNIN

CALCULATION OF INTEGRAL AND DIFFERENTIAL COMPOSITION OF QUADRUPLE COPOLYMERS

The integral and differential compositions of quadruple carboxyl-containing butadiene-styrene-methyl methacrylate copolymers were calculated at different conversions of monomers. As a result of the work the new adhesive composition on the base of the latex of quadruple carboxyl-containing butadiene-styrene-methyl methacrylate copolymer was obtained which provides the higher adhesion at laminating and agglutination of different materials.

Key words: butadiene-styrene-methyl methacrylate copolymer, latex

M.V. KULIKOV, B.S. TUROV, N.S. MINEEVA, N.V. KAMKINA, S.S. LUGOVSKOY, T.E. ABRAMOVA

SYNTHESIS AND PROPERTIES OF EPOXYDATED LOW-MOLECULAR STYRENE-BUTADIENE COPOLYMERS

The process of epoxydation of low-molecular styrene-butadiene copolymers of different compositions was studied. The method of hydroperoxide epoxydation in the presence of molybdenum catalysts was shown to provide the obtaining a new class of modified oligomers with a statistical distribution of epoxy groups along the polymer chain. The properties of epoxydated styrene-butadiene copolymer were investigated.

Key words: styrene-butadiene copolymer epoxydation, hydroperoxide, molecular weight, viscosity

O.N. KARATUN, N.B. KAPIZOVA

ISOLATION OF AROMATIC HYDROCARBONS BY EXTRACTIVE DEAROMATIZATION

The process of extraction of aromatic hydrocarbons from a mixture of saturated hydrocarbons by means of individual and mixed extractants was studied. A mixture of n-heptane and toluene was used as raw materials for the process. The comparative analysis of the extraction ability of triethylene glycol, N-methylpyrrolidone and mixed extractant used in the extraction dearomatization process showed that mixed extractant containing 70% (vol.) of triethylene glycol and 30% (vol.) of N-methylpyrrolidone is the most effective in different technological conditions.

Key words: aromatic hydrocarbons, reformat, extraction, triethylene glycol, N-methylpyrrolidone

I.O. MIKULIONOK

ON MODELLING OF WORM EXTRUSION

The approach to mathematical modelling worm extruders is considered. The approach used satisfies as much as possible to real conditions of processing. The process was tested successfully at designing and modernization of the industrial equipments for both polymer extrusion and materials on their basis.

Key words: worm extrusion, polymers, boundary conditions, modelling

V.A. EFIMOV, S.V. MIKHEEV

KINETICS OF CHANGE OF NUMBER-AVERAGE DEGREE OF POLYMERIZATION AT IRREVERSIBLE POLYMERIZATION ACCOMPANIED BY CHAIN TRANSFER AND DESTRUCTION

The kinetic scheme of the «living» irreversible polymerization accompanied by kinetic chain transfer and destruction of forming macromolecules was considered. The equation describing the change of number-average degree of polymerization as a function of monomers conversion was obtained.

Key words: irreversible polymerization, number-average polymerization degree, chain transfer, destruction

V.E. MIZONOV, Yu.B. KAZAKOV, E.A. BARANTSEVA, V.A. PHILIPPOV

NON-LINEAR CELL MODEL OF PARTICLE SEDIMENTATION IN CONCENTRATED SUSPENSION

A non-linear mathematical model of particles separation from concentrated suspension in the field of non-homogeneous mass force taking into account the influence of particle concentration on sedimentation rate and possibility of plugs formation was proposed. Computational estimation of these factors influence on prediction of separation kinetics was done.

Key words: cell model, particle concentration, transition probabilities matrix, separation kinetics

G.A. ZUEVA, G.N. KOKURINA, V.M. DMITRIEV, N.A. ZUEV, V.A. KARASEV

EXPERIMENTAL STUDY OF LINEN FIBRE CONVECTIVE DRYING

The study of linen fibre convective drying was carried out. The porosity and density of material was determined. The data on drying kinetics and heating the linen fibre were obtained using the special created experimental set-up. On the base of these data the curves of drying and heating were built and the moisture content dependence on the temperature of drying agent was described.

Key words: drying, linen fibre, drying and heating curves

A.V. BYKOV, L.ZH. NIKOSHVILI, M.B. KONYAEVA, A.V. SEMENOVA, A.A. STEPACHEVA, E.M. SULMAN

CATALYSTS OF CHEMO- AND ENANTIOSELECTIVE HYDROGENATION ON BASE OF HYPERCROSSLINKED POLYSTYRENE

This work is devoted to the synthesis and investigation of physicochemical and catalytic properties of platinum and palladium nanoparticles stabilized by the matrix of hypercrosslinked polystyrene. The use of polymeric support was shown to allow developing active and stable chemo- and enantioselective hydrogenation catalysts.

Key words: selective hydrogenation, platinum, palladium, hypercrosslinked polystyrene, ethylpyruvate, dimethylethynylcarbinol

V.Yu. BUZKO, D.V. KASHAEV, I.V. SUKHNO

STUDY OF DYNAMICS IN 1-N-BUTYL-3-METHYL-IMIDAZOLIUM CHLORIDE BY NMR ³⁵Cl METHOD

The temperature dependence of ³⁵Cl NMR spectra of ionic liquid 1-n-Butyl-3-Methyl-Imidazolium Chloride was experimentally studied. The calculated spin-spin relaxation times suggest that the motion of Cl⁻ anion in [BMIm][Cl] occurs with the breaking at least one Cl⁻⋯H-C type bond.

Key words: ionic liquid, NMR relaxation, microdynamics, activation energy

E.S. KAPUSTINA, V.M. MAKAROV, S.M. KAPUSTIN

DETERMINATION OF GROUP CHEMICAL COMPOSITION OF GREEN OIL WASTE AFTER PASSING SOIL FILTER AND IT'S INDUSTRIAL UTILIZATION

The contents of the drainage system of ground tanks of former carbon-black plant were undergone to chromatographic analysis. The structure of waste was studied by infrared spectroscopy. The researches of green oil recycling by its industrial application were described.

Key words: green oil waste, chromatographic analysis, infrared spectrum, bloating additive, expanded clay, softening agent, styrene-butadiene rubber SKMS-30ARK, butadiene-nitrile rubber BNCS-28AMN, carbon black

L.S. DUROSOV, S.M. DUROSOV, M.E. SOLOVYOV

INFLUENCE OF COMPOSITION-TECHNOLOGICAL FACTORS OF MECHANICAL-CHEMICAL MODIFICATION OF RUBBER CRUMB ON PROPERTIES OF RECEIVED COMPOSITIONS

Milling processes with reception of rubber crumb of various degree of dispersion are a perspective direction of processing the wastes of rubber industry. The samples containing types of rubber crumb differing by dispersion of particles and chemical composition were investigated. Studying the influence of composition-technological parameters allows optimizing the production process of solid goods from secondary raw materials of rubber industry.

Key words: secondary raw materials, milling, rubber, crumb, modification, composite materials